

How Shale Produces Natural Gas

Technology has made it possible to extract natural gas from rock formations

Exciting American technology has found a way to extract natural gas from shale rock formations. Drilling in shale production requires hydraulic fracturing, known as “fracing” (pronounced fracking), because unlike conventional wells the gas is contained in smaller pockets within porous shale formations.

A conventional drill grinds down into the earth with the aid of a drilling fluid, called mud. The mud cools and cleans the bit, carries debris to the surface and also cakes the walls, keeping it intact. In order to protect and isolate the fresh water, a casing is inserted into the drilled hole once the drill has been removed. Cement is then pumped down the casing, out through the opening of the shoe at the bottom and up between the casing and the hole, sealing off the wellbore from fresh water. The cementing process prevents contamination of the fresh water aquifers.

Drilling continues until the “kickoff point” is reached, where the curve and horizontal drilling will begin. The beginning of the curve to where the well bore becomes horizontal is just under a ¼ of a mile. Once the curve is completed drilling begins on the well’s horizontal section or lateral. The pipes used to drill the lateral are 30 foot sections and weigh approximately 500 pounds each. When the targeted distance is reached, the

drill pipe is removed, a production casing is inserted and the cementing process is repeated. The casing permanently secures the wellbore and prevents hydrocarbons and other fluids from seeping out. Drilling is complete at this point and the rig is removed.

A perforating gun is lowered into the casing to perforate the targeted section of the natural gas-bearing shale. An electrical current sets off a charge that shoots small holes in the cement and out a short distance into the shale formation.

A mixture of water, sand and chemicals are pumped into the well bore and down the casing under extremely high pressure. As the mixture is forced out through the perforations and into the surrounding rock, the pressure causes the shale to fracture, creating a fairway, allowing the released gas to flow to the wellbore. This process is repeated along the horizontal section. The next step is to install a permanent wellhead, also known as a Christmas tree. A pipeline is then built to transport the gas to the pipeline network.

Thanks to the vision and persistence of those that have perfected hydraulic fracturing, shale plays across the U.S. have become an innovative and highly productive source of new energy for our country.

